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For nearly 100 years, the name Master Builders has meant products, service, and support you can count on, and we don’t plan to change that. Degussa Admixtures will continue to sell Master Builders brand products, and provide the technology and value producers depend on every day.
The 2004 hurricane season was the worst in nearly a century, causing more than $20 billion of damage as four storms in two months battered the southeastern U.S. Like the Four Horsemen of the Apocalypse, hurricanes Jeanne, Frances, Ivan and Charley tore through Florida and up the Atlantic coast, destroying thousands of homes and businesses.

As if anticipating what was to come, a Savannah, GA, businessman started building an all-concrete home in April 2004. Situated midway between Savannah and Tybee Beach near the mouth of Betz Creek, the house is a veritable showcase of the latest technology in concrete construction. Featuring 13,000 square feet of enclosed space, of which 5,600

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The Ultimate Concrete Coastal Home Features the Latest in Concrete Construction

By Bruce Strickland, Regional Manager, Sika Corporation

---

View of rear terrace area highlighted by a nautilus-shaped pool and spa. Intricate formed wall systems are possible with self-consolidating concrete. At rear is the deep-water dock constructed of prestressed double tee’s supported by 60-ft. pre-stressed pilings.

Front elevation features a 37-ft. wall with 5-ft. opening near the top. An elevator and stairwell will be inside the radius, which will be topped off by a rotunda-type dome. The top two floors are ICF; the first floor walls were poured in place with an aluminum wall-forming system using self-consolidating concrete.
around the foundation of the structure. In addition, it is fully excavatable and affords a greater margin of safety when trenching in high-water-table areas like coastal Georgia. Additional material composed of recycled waste concrete crushed into a small stone and sand mixture was used above grade, providing a compactable, pervious fill.

The first floor and garage walls were poured in place, using steel forms and self-consolidating concrete. The enhanced flowability of the concrete allowed the 10-foot-high by 10-inch-thick wall to be poured at one time with minimal movement of the pump.

The majority of the concrete used on the job was self-consolidating, which eliminated the need for vibrators and resulted in smooth, honeycomb-free walls. “You also have to understand that water is the enemy of concrete, which contains cement, stone and sand. If you add too much, it will rise to the top and the rest of the materials will settle out. If you have 600 to 700 pounds of cement, you simply cannot add enough water to make it flow,” explained Howard.

“With the use of new cement and admixture technologies, the contractor can have his cake and eat it too,” he added. “For the first time in the history of modern construction, you can actually pour concrete into its final position without these adverse effects. The conventional method of placement using vibration is labor-intensive and puts stress on form work, but without which pitting, voids and air pockets occur in the structure.”

Because the house is located in a flood plain, there is no livable space below 15 feet above sea level. Flowable fill, a combination of sand, fly ash, cement and water, was used instead of compacted fill to raise the garage floor two feet above grade. This provided a guarantee of full compaction (95 percent modified Proctor) around the foundation of the structure. In addition, it is fully excavatable and affords a greater margin of safety when trenching in high-water-table areas like coastal Georgia. Additional material composed of recycled waste concrete crushed into a small stone and sand mixture was used above grade, providing a compactable, pervious fill.

The first floor and garage walls were poured in place, using steel forms and self-consolidating concrete. The enhanced flowability of the concrete allowed the 10-foot-high by 10-inch-thick wall to be poured at one time with minimal movement of the pump.
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The second and third floors were poured using a 2.5-inch pump to deliver a No. 89 stone self-consolidating concrete mix into insulated concrete forms. Consisting of 2.5-inch closed-cell foam walls held together by a polyethylene rib structure that can accommodate integral rebar, the 4-foot-long by 16-inch-high by 9- to 13-inch-wide flat wall forms stack much like toy Lego blocks, according to Howard. The forms remain in place after the concrete has been poured into them, providing an effective R value of more than 30 to reduce utility bills by 50 to 80 percent.

The second floor walls, which are 13-feet, 4-inches-high with 8-inch-thick concrete cores, were poured at one time. Window bucks were secured by tie wire and rebar, and observation holes in the bottom of the sills allowed workmen to see when the concrete came up to their level, assuring the forms were completely filled. Both the second- and third-floor exterior walls consist entirely of filled ICFs.

The front of the house features a 37-foot, 3-inch shear wall that was poured on a 10-foot radius. Despite the difficulty posed by a 5-foot hole in the upper three-quarters of the wall, it was poured in just two lifts, again with no vibration or honeycomb ing. The flooring system of the house consists of extruded, pre-stressed concrete hollow-core deck panels normally used in hotels and other commercial structures. The 8-inch-thick by 4-foot-wide
materials and construction methods can be integrated. Designed to be virtually maintenance-free, all exterior walls will be coated with an acrylic stucco when construction is completed in early 2006.

Although the house is not considered a mansion by its owner, its features numerous upscale amenities, including solid mahogany doors and woodwork, a large screened-in porch with outdoor kitchen, a 4,400-square-foot garage and a nautilus-shaped, beach-entry gunnite swimming pool.

“Given the level of hurricane activity we’ve seen in recent years, I have to believe concrete houses are the future of construction in coastal areas,” concluded Howard. “With advances such as self-consolidating concrete with flow-enhancing admixtures, ICFs and prestressed decking and piling, that future will be sooner than later.”

Strickland is regional manager for Sika Corporation. For more information, contact him at strickland.bruce@sika-corp.com.

The views and opinions expressed in this article are those of the author and do not necessarily reflect the views and opinions of the National Ready Mixed Concrete Association.
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Congratulations NRMCA on 75 years of industry leadership and advocacy!
NRMA is committed to advising its membership to follow the “letter of the law” as it relates to employee safety, health, environmental and transportation compliance. The association aids membership with compliance issues through contact with regulatory bodies such as the Occupational Safety and Health Administration (OSHA), the Environmental Protection Agency (EPA) and the Department of Transportation (DOT). Government Affairs staff regularly contacts elected officials in the United States Congress on behalf of the membership. Educating industry personnel and providing interpretive guidance for members in compliance ensures standards awareness. The presumption is then that knowledge produces a fair and equitable scheme for regulatory enforcement.

What has OSHA enforcement been like over the past few years at ready mixed concrete production facilities?

National Ready Mixed Concrete Association (NRMCA) searched the Occupational Safety and Health Administration database for inspections of Standard Industrial Classification code 3273 (ready mixed concrete manufacturing) for the period January 1998–June 2004. NRMCA analyzed OSHA inspections of ready mixed concrete producers in each of the 10 OSHA regions. Types, locations, numbers of citations and paid penalty assessments were all reviewed. NRMCA determined that 56 percent of all paid penalties originated in OSHA Regions III, IV and V. The corresponding geographic regions in the U.S. are respectively the mid-Atlantic, the Southeast and the Upper Midwest. The remaining seven OSHA regions were responsible for issuing 44 percent of the total penalties.

Why is this a problem?

Traditionally OSHA enforcement has been random. Recently, however, ready mixed concrete manufacturing has been specifically identified in OSHA’s site-specific targeting program, and concrete and concrete products have been broadly targeted in OSHA’s long-range strategic plan that runs through 2008. This recognition has the potential to increase enforcement actions, and in the process widen the gap among OSHA regions and its compliance activities — e.g. OSHA regions where many penalties are issued and paid will increase its activities and producers in these regions are at greater risk of being cited.

What is NRMCA doing now to address inequitable enforcement?

NRMCA is working most closely with its Operations, Environmental and Safety Committee (OES) to gather specific examples of inequitable enforcement throughout the...
U.S. Although the OES Committee is the primary source for the data, another standing committee that is called upon to provide assistance is the Business Administration Committee (BAC). OSHA, EPA and other appropriate federal bodies must be made aware of uneven enforcement and furthermore must address the issue. Compliance enforcement must not be a function of company size or geographic location. Non-compliance with the law allows an unfair advantage. All companies in the ready mixed concrete business must know the health, safety, environmental and transportation standards that apply to their operations, and then put that knowledge into practice to ensure a safe and healthful workplace for employees!

What must happen in the future to address standards’ compliance challenges and the commensurate uneven regulatory enforcement in our industry?

For plants to achieve ‘Excellence in Environmental, Safety, Health and Transportation Systems,’ NRMCA envisions a structure wherein participants audit themselves not only for standards compliance, but also measure performance within a dynamic system that includes raising the bar as new compliance system approaches and technology are introduced. NRMCA is crafting the structure for companies to use to benchmark standards compliance. From the environmental, safety and health perspective, partnerships such as Performance Track and SAFE already are in place and will help provide a basis for developing self-audit checklists. Specifics such as reducing air, water and land emissions and energy consumption in the environmental arena combined with eliminating injuries and illnesses in the safety and health areas are outlined in our partnerships. By analyzing lagging indicators such as citations and penalties, incidence rates and truck roll-overs, we are developing and adopting best practices in environmental, health, safety and transportation to incorporate hazard analyses into the partnerships, and subsequently into the e-squared initiative. Ultimately, the partnerships we have today will become the regulatory and legislative framework in the future that outlines compliance standards the industry will follow.

Harman is director of safety compliance for NRMCA. For more information, contact him at tharman@nrmca.org or 240/485-1155.
Biodiesel…

The Next Thing for Fueling Ready Mixed Concrete Trucks?

By Gary Mullings, Senior Director of Operations & Compliance, NRMCA

As ready mixed concrete producers are faced with ever-rising fuel costs, they are beginning to investigate alternative fuels that will save them money. One of the new fuels that has received much attention lately is called biodiesel. Biodiesel is a domestically produced, renewable fuel that can be manufactured from vegetable oils, animal fats or even recycled restaurant greases. Biodiesel is biodegradable and reduces serious air pollutants such as particulates, carbon monoxide, hydrocarbons and air toxics.

Just like petroleum diesel, biodiesel operates in compression-ignition engines. Blends of up to 20 percent biodiesel (B20 mixed with petroleum diesel fuels) can be used in nearly all diesel equipment and are compatible with most storage and distribution equipment. These low-level blends (20 percent and less) generally do not require any engine modifications; however, users should consult their OEM and engine warranty statement. According to reports, biodiesel can provide the same payload capacity as diesel.

Higher blends, even pure biodiesel (100 percent biodiesel, or B100), may be able to be used in some engines (built since 1994) with little or no modification. However, engine manufacturers are concerned about the impact of B100 on engine durability. Additionally, B100 is generally not suitable for use in low temperature conditions. Transportation and storage of B100, however, require special management.

Using biodiesel in a conventional diesel engine substantially reduces emissions of unburned hydrocarbons, carbon monoxide, sulfates, poly cyclic aromatic hydrocarbons, nitrated poly cyclic aromatic hydrocarbons and particulate matter. These reductions increase as the amount of biodiesel blended into diesel fuel increases. The best emission reductions are seen with B100.

The use of biodiesel decreases the solid carbon fraction of particulate matter and reduces the sulfate fraction while the soluble, or hydrocarbon, fraction stays the same or increases. Therefore, biodiesel works well with emission control technologies such as diesel oxidation catalysts (which reduce the soluble fraction of diesel particulate but not the solid carbon fraction).

How is biodiesel made? According to the U.S. Department of Energy (DOE) Alternative Fuel Data Center, biodiesel fuel can be made from new or used vegetable oils and animal fats, which are nontoxic, biodegradable, renewable resources. Fats and oils are chemically reacted with an alcohol (methanol is the usual choice) to produce chemical compounds known as fatty acid methyl esters. Biodiesel is the name given to these esters when they’re intended for use as fuel. The oils and fats are filtered and preprocessed to remove water and contaminants. If free fatty acids are present, they can be removed or transformed into biodiesel using special pretreatment technologies.

Approximately 55 percent of the biodiesel industry can use any fat or oil feedstock, including recycled cooking grease. The other half of the industry is limited to vegetable oils, the least expensive of which is soy oil. The soy industry has been the driving force behind biodiesel commercialization because of excess production capacity, product surpluses and declining prices. President George W. Bush has praised biodiesel as an alternative fuel. The President got a tour of a plant near Richmond, VA, recently, which turns soybean oil into fuel for use in diesel engines. He called it one of the United States’ most promising alternative fuel sources — and says every drop that’s used is a boost for U.S. farmers and a blow against pricey foreign crude oil. He notes biodiesel is also good for the environment because it burns cleaner than either gasoline or regular diesel.

According to reports, biodiesel can provide the same payload capacity as diesel. Higher blends, even pure biodiesel (100 percent biodiesel, or B100), may be able to be used in some engines (built since 1994) with little or no modification. However, engine manufacturers are concerned about the impact of B100 on engine durability. Additionally, B100 is generally not suitable for use in low temperature conditions. Transportation and storage of B100, however, require special management.

For more information, you can contact Mullings, NRMCA’s senior director of operations and compliance, at gmullings@nrmca.org or 240/485-1161.
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Brighten Your Market Opportunities with Color

Capture Your Share of the Fastest Growing Segment of the Concrete Market

By Art Tyson, Color Specialist, Grace Construction Products

The market for integrally colored concrete is taking off.

Advances made in the products and systems for adding color to concrete now offer concrete producers another way to increase the use of concrete and position concrete as an aesthetically pleasing design option.

Of course, market leaders and innovators in the concrete industry already know and use the concept of “value-added” to sell concrete. It is a time-tested way to differentiate products in the marketplace and achieve a price premium over standard concrete. With recent improvements in consistent and cost-effective integrally colored concrete production, changing the color of concrete can add another value-added product to your offerings, adding new revenue and increasing profit margins.

Today’s technology for dispensing and selecting liquid pigments for adding color provides the ability to push the aesthetics of concrete with greater reliability and confidence. It’s a market being driven by forward-thinking ready mixed producers, builders, contractors and architects who understand the business and growing value of colored concrete. Through training programs and experience, contractors are becoming increasingly skilled at turning once gray concrete into an exciting new design element. And with new creative techniques and a wide range of finishes and surface treatments that can only be achieved with integrally colored concrete, the market opportunity continues to expand.

The Leading Edge

With the adoption of liquid pigment dispensing systems and the flexibility, consistency and accuracy that automated coloring offers ready mixed producers, liquid colored concrete is being increasingly specified for a wider range of both commercial and residential applications. Colored concrete can be found in walkways, driveways, patios, interior floors, walls and pool decks, using different colors and textures to create expressive and artistic treatments.

“With liquid color technology there are simply more options for design,” said
A Growing Opportunity

It is estimated that of the 400 million cubic yards of ready mixed concrete produced annually in the U.S., seven million cubic yards, or about 1.5 - 2 percent, is integrally colored concrete. The demand for colored concrete is expected to more than double over the next five years. That’s an outstanding profit opportunity for concrete producers who recognize the added value that integrally colored concrete offers customers.

With an estimated 60 percent of the color market in residential construction, the continued healthy growth in home construction and the resulting increase in residential concrete volume bode well for those offering integrally colored concrete and seeking to increase their market share.

“We’re seeing automated liquid color increasingly being used in the residential building market, where a quick turnaround is needed. Our ready mixed producers find that the automated dispensing technology lets them respond without having to keep special inventory on hand,” said Chris Forgey, commercial development manager for Grace Construction Products. “And homeowners are finding that integrally colored concrete adds to the value of their home, so it’s an increasingly popular design option.”

While colored concrete was once primarily used as a design element in the West and Southwest, the ease of use and popularity of automated dispensing systems has led to increases in colored concrete demand in other parts of the country.

Concrete Steps to Earn More

To make liquid color work for your business, adopting the technology is the first step. A liquid pigment automated dispensing system enables colors to be dialed in using sophisticated yet easy to use technology that precisely mixes the appropriate base pigments from just four or five bulk storage tanks. In addition to making color inventory management simple, the system ensures consistency and repeatability with each load as the pre-blended colors are discharged into the truck mixer. The intuitive controls make the system easy to use and provide a level of

Jami Taylor of Lafarge North America and the American Concrete Institute's Georgia Chapter president. “We give our customers a bigger palette, free rein and the ability to be more creative while still being cost-effective.”

“The liquid color dispensers we use keep us on the leading edge of technology. It’s an advantage for our customers because we can service them immediately. With powdered pigment, you have to order the bags, a non-standard color may take several days, then get it to the plant, make sure it’s the right color and right amount. With the liquid color, there’s no wait and we’re satisfying our customers immediately.”

In addition to ensuring color consistency and simplifying operations by increasing efficiency, a liquid color dispensing system can increase productivity. “For Lafarge, the productivity advantage is huge,” said Taylor. “Using a liquid color system saves us manual steps and about 10 minutes on every truck load. And the faster we can get each truck on the road, the more efficient we can be. In turn, our customers get better, faster service and a more consistent product. Without all the extra steps needed, our drivers can provide better service to our customers. Our contractor customers are enthusiastic because it’s easier for them. We get the colored concrete to the job site faster, the pours go smoother and product issues are eliminated since the color process is practically foolproof.”

Metro Ready Mix used a liquid color system to supply the sandstone colored concrete for this walkway in downtown Nashville, TN. The exposed aggregate was treated with a surface retarder.
The technical aspects of the project are covered is critical, but it’s just as essential to understand from the beginning all expected outcomes pertaining to the desired color and finish,” said Gary Miller, color product specialist with Grace Construction Products.

Since concrete is made from naturally occurring materials that can vary widely, colored concrete can also have variations. Patterns from stamping, brooming or exposed aggregate which diffuse light differently can provide a more uniform appearance. It is important to pre-educate customers about textures and color variations and show them similar completed jobs if possible.

To correctly select color, Miller suggests three steps. First, use a color swatch brochure to select the desired colored pigment. Second, view a colored sample tile from an established color manufacturer. The sample color tile is simply a small block of concrete already prepared with a specified integral color. Third, create an on-site mockup with a three-yard mix sample at least 28 days before the pour to allow the concrete to cure and see the final color. To get as close to the actual desired look as possible, this mock-up sample should utilize the same liquid pigment, concrete mix ingredients, site conditions and surface finish as will be used for the actual final pour. Alternatively, view a completed project with the same color and finish.

Going to Market

A key to any successful color ready-mixed program is also taking your product to market. While successful jobs will speak for themselves, it is also your job as the ready mix producer to get the word out and let your market know that you’re now offering colored concrete.

Since your key contractors will likely represent your highest volume users of colored concrete, it is important to identify these key customers, then ensure they understand the value of colored concrete through seminars and showcases. After all, contractors who place and finish colored concrete generally earn more per square foot than contractors who place uncolored concrete. Whether for renovation or new construction, integrally colored concrete opens up possibilities and business opportunities for them.

Look for programs that can guide you through the do’s and don’ts of informing and educating your marketplace about the benefits of integrally colored concrete with promotion strategies. Such programs can guide you on how to stage a successful seminar and how to market the product through on-hold messaging, media spots on local stations and how to run print ads with templates designed to get you up and running quickly. In addition to educating and informing contractors, you’ll want to reach out to homeowners and home builders and call on architects to let them know you now offer integrally colored concrete in your market.

Like creating concrete itself, creating a successful marketing program requires the
right mix and working with experts and product specialists can ensure your success from the start.

“Outstanding Growth Across the Marketplace”
Lafarge North America

“The market for colored concrete is growing tremendously as people find out what you can do with color,” said Alex Forrester, the color manager at Lafarge North America in the Atlanta Metro area. “The cost savings compared to tile, pavers and stone makes it a great alternative that wasn’t available before.” Forrester reports he’s seen outstanding growth in both Lafarge’s residential and commercial colored concrete business with the liquid color system in place just over a year and that they are growing their colored concrete business more each month. “For homebuilders, we’re demonstrating our colored concrete capabilities with model homes and driveways that show home buyers an attractive upgrade option,” said Forrester. “Through trade shows, home shows and a great number of box lunch presentations, we’re showing customers how color has evolved and how much easier it is to use. With our admixture partners, we are visiting architects and bringing contractors to our facility each month to train them on how to effectively work with colored con-crete — how to sell, market, pour, stamp — everything involved. We learned what we needed to know from our color representative who helps us on an ongoing basis. We’re a good team.”

Nearly 900 yards of desert sand colored concrete was poured for this supermarket floor created with a liquid color system at Metro Ready Mix in Nashville.

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In Simi Valley, California, Team Transit Ready Mix provided integrally colored concrete in “Omaha Tan” earth-tone shades for this resident’s pool deck, jacuzzi and back patio areas.
CONCRETE in focus

Demand will continue to grow. And his salespeople are finding that homeowners, commercial owners, architects and developers prefer colored decorative concrete to gray sidewalks, painted tilt panels or cast-in-place walls or columns. “Our goal is to increasingly develop the market and the people we’re doing business with have been eager to make the move to integral liquid color,” said Bumgarner. “There are still a few holdouts, but those who have tried it have been enthused and are looking forward to expanding their color business. We’re seeing interest among engineers and architects, homebuilders, municipalities and public transit officials. Most of our business so far has been with the customers we’re working with every day. We’re communicating with them through direct contact with our sales reps and contractor training seminars. And we have plans for printed materials, mailings, trade show programs and offering continuing education credits to promote liquid color. We’re finding people are definitely excited — and it shows in our business results.”

“You Get Out of It What You Put Into It” Metro Ready Mix, Inc.

As vice president/general manager of Metro Ready Mix in Nashville, TN, Steve Herron recognized color as an emerging market early on. After selling powdered color for years, a liquid color dispensing system provided greater consistency and a convenient way to provide many different colors at a moment’s notice without having to order specific bagged products or keep an enormous inventory on hand. “We saw the market heading toward more and more colored concrete in both the residential and commercial area. And having the colors readily available with a liquid dispensing system has been a factor in our ability to significantly increase our sales of colored concrete,” said Herron. “We’re seeing colored concrete increasingly specified on commercial jobs, malls, restaurants, upscale homes — and we’re seeing continuing growth and interest. We’ll bring in specifiers and users of colored concrete to tour our facility and equipment to show how color works. They’re impressed with the improvements in consistency and reliability that liquid color offers. And we aggressively market our colored concrete and train our sales force, as well as provide marketing materials for our customers.” When it comes to marketing colored concrete, Herron says that you get out of it what you put into it — so he’s confident about Metro’s growing opportunities.

“Four Times the Growth” TXI Operations, L.P.

“We’ve had a liquid pigment dispensing system in place for about a year and a half and we’re seeing the market for integral liquid color beginning to take off,” said Eric Bumgarner, manager of marketing and business development for TXI Operations, a leading producer of cement aggregate and concrete in the Southwest. “With the ability to be more consistent and accurate with our deliveries, it enables the contractor and owner to get faster, more reliable results and to be a lot more comfortable pouring color. With liquid color, we’re already pouring four times the colored concrete than in previous years. And with our liquid system, there are no more discussions about two- to three-week lead times or warehousing bags of color needed.” Bumgarner feels that as people see color in the marketplace, the demand will continue to grow. And his salespeople are finding that homeowners, commercial owners, architects and developers prefer colored decorative concrete to gray sidewalks, painted tilt panels or cast-in-place walls or columns. “Our goal is to increasingly develop the market and the people we’re doing business with have been eager to make the move to integral liquid color,” said Bumgarner. “There are still a few holdouts, but those who have tried it have been enthused and are looking forward to expanding their color business. We’re seeing interest among engineers and architects, homebuilders, municipalities and public transit officials. Most of our business so far has been with the customers we’re working with every day. We’re communicating with them through direct contact with our sales reps and contractor training seminars. And we have plans for printed materials, mailings, trade show programs and offering continuing education credits to promote liquid color. We’re finding people are definitely excited — and it shows in our business results.”

Industry Consolidation Continues

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so many leads, Hyatt also uses the contacts from the radio spots to provide referrals to preferred contractors when customers ask for names, which helps strengthen the company’s business relationships. “When you look at an overall construction project, color is such a small portion of the cost yet such a large portion of the overall appeal,” said Hyatt. “I see the market continuing to grow and offering color is an integral part of our success. We see no downside to it. None.”

The views and opinions expressed in this article are those of the author and do not necessarily reflect the views and opinions of the National Ready Mixed Concrete Association.

TXI Operations provided the integrally colored concrete for this broom finished brick red sidewalk and drive in Longview, TX. Pleased with the results of this project, the builder is developing a new subdivision featuring colored drives, patios and sidewalks.
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Nearly 50 years old, Vermont-based S.T. Griswold & Company prides itself on its relationships with its employees, with many of them measuring their tenures in decades rather than years. This loyalty stems from the legacy of company founder Steele T. Griswold, who in 1957 watched batches of concrete mixed on site at Burlington’s then-new airport. He realized there was a better way to deliver such a product and started a business with one plant and six mixer trucks.

Fast forward half a century. Doug Griswold, son of Steele, is now the man in the head office. He oversees a construction materials company that features five ready mix plants, retail outlets, one quarry, a fleet of 80 trucks and more than 200 employees. This snapshot doesn’t do justice to a company that has grown to become the most diversified “concrete” company in the Green Mountain State, with products and services that include architectural precast building facades, high-tech septic systems, custom-made tunnels and masonry supplies.

But — as every industry executive knows — growth has its challenges. And in the case of S.T. Griswold, a primary challenge was attracting drivers. Help wanted ads, raiding competitors, employee referrals and other methods were discussed by senior management and implemented to some extent. But a truly innovative approach was developed as a result of a conversation between Doug Griswold and the Northern New England Tradeswomen.

“The discussion centered on how difficult it is to attract qualified employees,” Griswold related. “And after several meetings, we decided to focus on finding qualified women.”

Bob Banka, the division manager of the ready mixed concrete side of the business, was then asked to build a curriculum that would address both concrete construction and mixer truck driving. And the statewide program, called Set It Up, was born. Partnerships were created with a host of local and regional organizations, including the tradeswomen group, the Vermont Agency of Transportation, the Vermont Office of Civil Rights & Labor, the Champlain Valley Driver Training School and the Vermont Department of Employment & Training. Set It Up was formed as an intensive six-week training program to prepare women for jobs in the concrete industry. The first class of nine women started in mid-March, proceeding through classroom instruction, jobsite visits and actual concrete placements.

That itinerary was followed by truck driver training school in order to obtain their CDL-B licenses. For the final week of class, they returned to the Griswold conference room to participate in NRMCA’s CDP (Certified Delivery Professional) program, Banka said, adding that the women then rode with S.T. Griswold’s driver trainers and worked with the architectural pre-cast division.

Griswold hopes that each of the nine women will be successful in the concrete industry. If all goes well, the program will be examined and implemented for 2006, Banka said.
What to Do About Our Disappearing Workforce

By Joan Dandurand

Over the past 10 years, we’ve heard about the shortage of teachers and healthcare professionals. The efforts to recruit individuals into teaching and nursing have included finding ways to attract men into these traditionally female-oriented fields, recruiting displaced workers from other industries, offering training methods and schedules that address the needs of the mature learner, better pay and benefits, flexible working hours, and respect for the all-important work-life balance of the 21st century. At the very least, we in the ready mixed industry can learn from the efforts made by the healthcare and education sectors and possibly adapt some of these efforts to attract qualified workers for our industry before too much more time passes.

More importantly, we can look to partnering with others in the construction industry who are currently addressing the huge workforce shortage that’s causing a bloating of construction costs and project delays.

Between current activity in the areas of homebuilding, commercial development and road construction, the ready mixed industry is busier than ever; the problem is, your plants might have more orders than you have driver-technicians to haul concrete to those construction sites, or QC technicians to partner with customers to ensure...
that the product meets the specs before it hits the ground, or plant operators who can master the controls in a way to efficiently and effectively keep production moving in the yard. And guess what, you aren’t alone. The workforce shortage in the ready mixed industry across the country is influenced by factors that relate to workforce shortages in the construction and trucking industries as well as broader demographic reasons. General stats and causes for the shortage include:

- In six years, the nation’s Baby Boomers will begin to reach retirement age and trigger a mass exodus from the workforce (as stated by the U.S. Census Bureau).
- Fact: The U.S. construction industry is the world’s largest industry, employing 6.9 million people; the Bureau of Labor Statistics (BLS) estimates that the construction industry will need to attract 240,000 workers each year to replace those leaving or retiring from the industry (the average construction worker is 47 years old).
- ATA (American Trucking Association) predicts that today’s over-the-road driver shortage is at 40,000 and will swell to 111,000 by 2014 and that doesn’t include the number of CDL drivers that we need in our industry (cement and concrete production trucking positions rate third after general and specialized freight trucking positions).
- Construction careers have a negative image as proven by the Job Rated Almanac that had construction jobs rated at 247 out of 250 jobs listed.
- There is an increase in enrollment in four-year colleges, which means fewer individuals interested in trades and driving careers (many of the drivers you have today work hard to be able to send their kids to college so that the children don’t have to be a truck driver like dad).
- Job creation is outpacing population growth; Baby Boomers are and will continue to be the largest population segment, so as they retire, there aren’t enough members of the next generations to replace them.
- It’s not in your imagination that the philosophy toward work is different between those currently in the workforce and those who will be joining the workforce, i.e. Baby Boomers have a different view of work than the current Xers and future Nexters have. Research results by the American Business Collaboration show that Baby Boomers are considered more “work-centric” than younger workers and that most American workers are “rejecting the work-centric style of their father’s workplace.”

So what do we do to combat these challenges? Sitting and lamenting about needing workers is not a solution. Putting pressure on your human resources department recruiters is not a solution. Neither is doing what you’ve always done to attract workers: advertising in the local newspaper; relying on employee referrals (this is still a good source; just make sure you’re rewarding for referrals); hiring from a competitor; attending job fairs; hiring any “warm bodies” that walk through the door, etc.

One easy step to combat the workforce shortage is to make every effort you can to keep the workforce talent you have today…retaining a worker that you’ve trained and developed is the smartest and least costly thing you can do. There are many ways you can retain workers: establish expectations when they are hired and then follow up to ensure that you and they are meeting those expectations; give them the proper training they need to do their job (offer them cross training so they stay challenged and to increase their value to you); pay them fairly; treat them fairly; train your supervisors in the proper way to be consistent and fair in disciplining; provide them a safe environment; give them a method to be heard; keep them informed of what’s ahead for your organization; say ‘thank you’ for their hard work and mean it; etc. If a valued worker should decide to leave, conduct an exit interview so you can understand why that person is leaving and then make adjustments to avoid losing other workers.

Learn from what others are doing within the construction industry. Do a Google search of ‘Construction Workforce Shortage’…you’ll be amazed at what you learn. In July in Boston, an alliance of construction firms, nonprofit organizations and city agencies launched the Building Careers Partnership, which placed 65 young people (most still in high school) in apprenticeship positions in construction-related firms in the city; in Maryland, the Prince George’s Community College is starting to offer training programs for construction jobs in high demand; in Virginia, a Northern Virginia Community College campus is starting a CDL program while the Commonwealth College system sponsors a Commonwealth Workforce Network for construction-related companies; the NCCER (National Center for Construction Education and Research) and Monster.com have formed an alliance to provide customers a one-stop online career resource center for the construction industry; the Construction Workforce Coalition in Houston supports a number of activities that organize field trips for both students and teachers/counselors to visit job sites and representatives from the construction industry are going into the classrooms to teach classes related to the industry; and there’s a “Helmets to Hard Hats” program to recruit retiring military veterans into the construction industry.

The ideas are endless and no single effort is going to be the magic elixir to attract all the workers the ready mixed industry needs. We might think about joining forces with the various sectors of the construction industry that have been working at finding ways to pique and keep kids’ interest in construction. The same way education and healthcare worked to attract men to their typically female-oriented fields, we’ve got to find a way to make our industry more attractive to women. In researching the demographic trends, the fastest growing population sector is the Hispanic sector…what can we do to draw these people to us?

No one company, state or construction trade association’s efforts alone can “fix” the workforce shortage problem; we need to work together to make our industry the “industry of choice” for the future workforce. Consider attending the upcoming Business Administration Conference, October 16-19, where these concepts will be expanded upon and ideas will be shared on creative ways producers are attracting and retaining a quality workforce.

Dandurand has been involved with the ready mixed industry for eight years...on staff with NRMCA, as a consultant to the industry, most recently as director of HR for Newington Concrete in Newington, VA, and soon to be affiliated with the CIM program at ASU. She’ll be a presenter at the Business Administration Conference addressing the “Coming Workforce Tsunami.” Contact her at Jdandurand@chooselpositive.com with efforts that your organization is making to combat the workforce shortage.

The views and opinions expressed in this article are those of the author and do not necessarily reflect the views and opinions of the National Ready Mixed Concrete Association.
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The Concrete Industry Management Program: Educating the Next Generation of Concrete Industry Professionals

By Jennifer LeFevre, Program Director, RMC Research Foundation

W hen the Concrete Industry Management (CIM) program debuted at Middle Tennessee State University (MTSU) in September 1996, it was inaugurated with only a handful of students. Today, this first-of-its-kind program boasts more than 300 currently enrolled students and over 100 graduates. Although leaders within the concrete industry fully expected the program to be successful, the positive impact this unique curriculum and its graduates are already making on the entire concrete community is well beyond their wildest dreams and the benefits these well-educated professionals are contributing to the industry are already readily apparent.

The industry’s response to the establishment of this program has been tremendous. Although once relegated to recruiting graduates from broader construction, engineering and business schools, companies within the concrete industry now have the opportunity to recruit recent graduates who come to the industry with significant industry knowledge and experience right out of college. The specialized curriculum of the CIM program entwines several key elements including not only courses in concrete and concrete technology, but also business, management and marketing, as well as other general studies components relating to other sciences, mathematics, communications, writing and even psychology. This coursework will also help to enhance the additional training that new industry professionals will receive over their careers, either through company training programs or from industry associations such as the National Ready Mixed Concrete Association. The Bureau of Labor Statistics, in an Occupational Outlook Quarterly report from Fall 2002, notes, “because many cost-conscious employers have limited the amount of training they offer, they prefer to hire more-educated workers who can assume greater responsibility sooner” (“College at Work: Outlook and Earnings for College Graduates, 2000-10”) and CIM students certainly fit the bill. These students come to companies ready to manage, ready to lead and ready to meet head on the many challenges the industry faces today.

While the program of study gives the students the tools they need to work within the industry, it is the internship requirement that helps to give the students the real-world experience other recent graduates coming into the concrete industry might not have. Some companies within the industry saw the opportunity to get these students involved early in their education through internships. Degussa Admixtures has taken a very proactive approach to working with the CIM students prior to graduation. Four years ago, before MTSU added the requirement that students complete an internship prior to graduation, Degussa established its own internship program specifically for CIM students. Melissa Wintucky, senior human resources generalist for Degussa, notes that the CIM program has definitely enhanced the industry and has assisted with both recruitment and the reduced need for training. “The internship program allows the students the opportunity to gain a true understanding of the industry,” she said, adding that CIM graduates often have “a better advantage than other new employees when they go through job training.” Internships also allow the students the opportunity to experience different aspects of the industry in order to help them decide what area they would like to go in to after graduation.

Tom Pittman, general manager for concrete operations in Aggregate Industries’ (AI) Mid-Atlantic Region, had to be talked into taking a CIM intern for the summer of 2003, just when MTSU instituted the internship requirement. Greg Sessa, now a driver supervisor, began his career at AI as that intern. So impressed with Sessa’s
performance, Pittman offered Sessa a job before he even completed his degree at MTSU. “I couldn’t be happier with Greg’s performance,” Pittman said. “I’d clone him if I could. The CIM program is a great asset to the industry.” And many other companies have had similar results with their own interns.

Sessa’s experience of having secured a job prior to graduation is not an anomaly. Fully 70 percent of this past May’s graduates from MTSU’s CIM program had job offers even before graduation and, when including those who graduated in August, the rate rises to over 74 percent. These statistics are not dissimilar from the graduates in previous years. Nearly all graduates have entered the industry shortly after graduation. These graduates are in high demand and are often wooed by not only strong starting salaries for a recent grad, but also with very generous benefits packages and even signing bonuses in some cases. The job offers and management growth opportunities for students coming out of this program are no doubt a reason for its thriving enrollment. And these students go into every aspect of the concrete industry: ready mixed concrete, precast, concrete construction, materials and equipment sales and beyond.

Eugene P. Martineau, president and CEO of US Concrete in Houston, TX, is serving as this year’s president of the CIM National Steering Committee and emphatically makes the point that these graduates are serving all areas of the concrete industry. “This program is the product of a broad-based concrete industry consortium and many aspects of the industry are involved in the National Steering Committee,” says Martineau, whose company has also hired several CIM graduates over the last few years. “This program brings all entities within the concrete industry together to combine resources and really benefit the entire industry overall to work to achieve the common goal of enhancing the industry. This is the future of our industry — young people coming into the industry with much more than just a basic understanding of the concrete industry.”

Martineau, who has been involved with the National Steering Committee’s work to expand the program to other universities, is optimistic that there will be four programs up and running by this time next year. The newest program will be inaugurated at Arizona State University’s (ASU) Del E. Webb School of Construction this fall. One of the goals of the National Steering Committee was to make the CIM program more geographically diverse and continued booming growth in the Southwest region of the United States made ASU a logical choice. The stellar reputation of ASU’s Del E. Webb School of Construction combined with the strong concrete industry support in Arizona and the surrounding states also made the choice easy. There is no doubt that ASU is a school where the CIM program will thrive.

The CIM National Steering Committee is also looking to expand the program further and is examining proposals from universities in California and the mid-Atlantic region. These universities meet several of the requisite criteria for implementation of the CIM program, including strong regional industry support, substantial financial resources, as well as the deep desire to implement this cutting-edge program at their institutions. These locations would also help to expand that geographical diversity and give students who are interested in the program more choice in where to pursue it. This fact will help the industry to further market the program to students who might not have considered such a program previously.

Support of the CIM program is an important element of the education mission of the RMC Research Foundation. “The RMC Research Foundation’s main objective is to support and promote education and research projects that will strengthen and improve the concrete industry. Naturally, the CIM program is an investment in the future of this industry and fits right into that mission,” says Julie Luther, executive director of the Foundation, who has also served on the CIM National Steering Committee and as a past president of the CIM Patrons supporting the first CIM program.

The Concrete Industry Management program is just one of many important projects and programs supported by the RMC Research Foundation that are making a significant impact toward improving the concrete industry every day. For more information on Foundation-supported research and education programs, please visit www.rmc-foundation.org or call 1-888-846-7622.
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How to Interview and Hire Top People Each and Every Time

By Gregory P. Smith

Ponder for a moment the last person you hired. After you selected him, did he work out as intended? Or did he turn into somebody totally unlike what you thought when you interviewed him?

The most important aspect of any business is recruiting, selecting and retaining top people. Research shows those organizations that spend more time recruiting high-caliber people earn a 22 percent higher return to shareholders than their industry peers. However, most employers do a miserable job selecting people. Many companies rely on outdated and ineffective interviewing and hiring techniques. This critical responsibility sometimes gets the least emphasis.

Hiring and interviewing is both art and science. Refusing to improve this vital process will almost always guarantee you will be spending money and time hiring the wrong people. Here are several reasons why traditional techniques are inadequate:

• The majority of applicants “exaggerate” to get a job.
• Most hiring decisions are made by intuition during the first few minutes of the interview.
• Two out of three hires prove to be a bad fit within the first year on the job.
• Most interviewers are not properly trained nor do they like to interview applicants.
• Excellent employees are misplaced and grow frustrated in jobs where they are unable to utilize their strengths.

Hire the best and avoid the rest. Cisco CEO John Chambers said, “A world-class engineer with five peers can outproduce 200 regular engineers.” Instead of waiting for people to apply for jobs, top organizations spend more time looking for high-caliber people. An effective selection and interviewing process follows these five steps:

Step 1 — Prepare. Prior to the interview make sure you understand the key elements of the job. Develop a simple outline that covers the job duties. Possibly work with the incumbent or people familiar with the various responsibilities to understand what the job is about. Screen the resumes and applications to gain information for the interview. Standardize and prepare the questions you will ask each applicant.

Step 2 — Purpose. Skilled and talented people have more choices and job opportunities to choose from. The interviewer forms the applicant’s first impression of the company. Not only are you trying to determine the best applicant, but you also have to convince the applicant this is the best place for them to work.

Step 3 — Performance. Identify the knowledge, attributes and skills the applicant needs for success. If the job requires special education or licensing, be sure to include it on your list. Identify the top seven attributes or competencies the job requires and structure the interview accordingly. Some of these attributes might include:

• What authority the person has to discipline, hire and/or fire others and establish performance objectives.
• What financial responsibility, authority, and control the person has.
• What decision-making authority the person has.
• How this person is held accountable for performance objectives for his team, business unit or organization.
• The consequences he is responsible for when mistakes are made.

Step 4 — People Skills. The hardest to determine, as well as the most important part of the process, is identifying the people skills a person brings to the job. Each applicant wears a “mask.” A good interviewing and selecting process discovers who is behind that mask and determines if a match exists between the individual and the job. By understanding the applicant’s personality style, values and motivations, you are guaranteed to improve your hiring and selecting process.
Obviously many jobs, particularly sales jobs, require a high degree of people contact. Placing someone in this job who dislikes interaction with others would be a mismatch, affecting his or her job performance.

Pre-employment profiles are an important aspect of the hiring process for a growing number of employers. By using behavioral assessments and personality profiles, organizations can quickly know how the person will interact with his coworkers, customers and direct reports. They provide an accurate analysis of an applicant's behaviors and attitudes, otherwise left to subjective judgment. The D.I.S.C. Assessment and the Personal Interests, Attitudes and Values are popular and useful tools.

**Step 5 — Process.** The best interview follows a structured process. This doesn’t mean the entire process is inflexible without spontaneity. What it means is that each applicant is asked the same questions and is scored with a consistent rating process. A structured approach helps avoid bias and gives all applicants a fair chance. The best way to accomplish this is by using behavioral based questions and situational questions.

**Behavior Based Questions**

Behavioral based questions help to evaluate the applicant's past behavior, judgment and initiative. Here are some examples:
- Give me an example when you . . .
- Describe a crisis your organization faced and how you managed it.
- Tell me about the time you reached out for additional responsibility.
- Tell me about the largest project you worked on.
- Tell me about the last time you broke the rules.

**Situational Based Questions**

Situational based questions evaluate the applicant's judgment, ability and knowledge. The interviewer first gives the applicant a hypothetical situation such as:

“You are a manager and one of your employees has just told you he thinks another worker is stealing merchandise from the store.”

- What should you do?
- What additional information should you obtain?
- How many options do you have?
- Should you call the police?

Greg Smith helps create high performance organizations that attract, keep and motivate their workforce. As president of Chart Your Course International, he has designed and implemented professional development programs for hundreds of organizations globally. As a business growth consultant, he has helped business owners reduce turnover, increase sales, deliver better customer service and reach long-term prosperity. He is published in hundreds of trade publications. He is also the author of Here Today, Here Tomorrow: Transforming Your Workforce from High Turnover to High Retention, the New Leader and several other books. For more information, visit www.chartcourse.com or call (800) 821-2487 or (770) 860-9464.

The views and opinions expressed in this article are those of the author and do not necessarily reflect the views and opinions of the National Ready Mixed Concrete Association.
In the summer of 2003, two private equity firms in Austin jointly acquired a Texas-based ready mixed concrete ("RMC") company. In 2004, a private equity firm in Boston acquired a North Carolina-based concrete company and a private equity firm in Minneapolis acquired a Louisiana-based cement and concrete company. Prior to 2003, there has been very little interest in the RMC industry from private equity firms, aside from the creation of U.S. Concrete. So what has changed? Why is the private equity community now focused on the concrete industry as a vehicle for investment?

On the surface, the RMC industry would not appear to have the sizzle and growth outlook to which private equity firms typically migrate. It’s a mundane, cyclical construction business. Peel back the onion, however, and the industry actually has numerous characteristics that make it appealing for private equity investment. Set forth below is a discussion of these characteristics as well as many of the other factors driving investment in the industry, including:

- Current market conditions for private capital;
- Investment criteria for private equity firms;
- Attractive characteristics of the ready mixed concrete industry;
- Key considerations for sale to a private equity firm; and
- Case studies of recent industry transactions.

Now is a time of impending structural change in the ready mixed concrete industry and we believe private equity firms will play a key role in facilitating such structural change. Owners of privately held RMC companies need to be prepared to address and react to these changes. Key to this preparation is developing an understanding of why private equity firms are investing in the industry, what are the investment criteria and what it means to be partners with a private equity firm.

Current Market Conditions for Private Capital

The first step to understanding private equity focus on the RMC industry is to appreciate how much capital is available for investment and that needs to be invested over the next few years. As discussed further below, private equity firms are money managers for large institutions and endowments. A typical investor in a private equity fund is a state pension fund or a university endowment fund. These large funds typically allocate a small percentage of their funds to “alternative investments” such as private equity in an attempt to diversify holdings and increase overall investment returns. Most private equity firms will create discreet limited partnerships with these institutions, setting forth management fees, specific investment criteria and mechanisms for...
sharing investment returns. The partnership agreements also establish time periods over which the capital is to be invested and then investment returns are to be realized. There are obviously exceptions, but typically a partnership will have a 10-year life with a five-year investment period. The implications of these partnership structures are very important to understanding the current market for private equity. Once a private equity firm raises a fund, it has five years within which the capital needs to be invested, or it potentially will be returned to the limited partners. Returning capital to limited partners is a bad economic outcome for a private equity fund as it loses not only the management fees associated with managing the capital but also any potential investment returns associated with investing the capital. As such, once a partnership is created, a private equity firm has very strong incentives for investing all of its capital over the next five years.

The 1998-2001 time period was an unprecedented time for the raising of private equity capital. Investment returns from private equity investing in the mid-to-late '90s were very attractive, which led to a significant increase in the number of private equity firms and the amount of equity capital that was raised by these firms. Set forth below is a chart of private equity capital raised by year, demonstrating this phenomenon.

Once this capital was raised, however, events of 2001 and the resulting economic slowdown significantly decreased the pace of investment for private equity firms. Much of the capital raised in 1999 and 2000 remained on the sidelines looking for opportunities. While activity has picked up over the last two years, a substantial private equity “overhang” remains for which the clock is ticking. Much of the capital raised in 1999 and 2000 needs to be invested quickly or it may have to be returned to limited partners as discussed above. This overhang has created a frenzy of activity for private equity firms seeking investment opportunities, and has significantly improved valuations and structures for sellers of businesses to private equity firms. Set forth at left is a chart demon-

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**Private Equity Overhang ($ in billions)**

![Chart of private equity overhang](image)

*Source: Venture Economics*
strating the current private equity overhang in the market.

One other factor that is positively affecting private equity investment is the increasing availability of debt capital that is used to finance private equity acquisitions. As discussed further below, one of the key variables that drives valuation for private equity firms is the amount and terms of debt that can be placed on a business upon acquisition. As demonstrated in the chart at right, debt capital providers are increasing the amount of debt they are willing to lend in conjunction with acquisitions, which creates higher valuations paid to sellers of businesses to private equity firms.

Overall, the private capital markets could not be more attractive for owners of companies desiring to sell, recapitalize or grow their businesses. There is a substantial amount of private equity that needs to be invested, and the availability of debt capital at attractive rates is also very high. The RMC industry should continue to be the beneficiary of this phenomenon and private equity firms will continually seek to invest in the industry over the next few years.

**Investment Criteria for Private Equity Firms**

To understand why private equity firms have developed an interest in the RMC industry, it’s important to understand how these firms think and what their criteria for investment are. As discussed above, most private equity firms are money managers for large institutions and endowments. As a result, the primary focus for a private equity firm is return on investment. First, most firms are compensated based on investment returns

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**Lending Multiple Trend (<$15 million EBITDA)**

![Chart showing lending multiple trend](chart.png)

Source: Standard & Poor's / Leveraged Commentary and Data

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and these firms typically do not receive much if any compensation (other than management fees) unless certain specified investment returns are achieved. Second, competition for investment by large institutions and endowments is very competitive and a private equity fund is able to raise capital for a new fund only if its historical track record is strong and in the top half or top quartile for comparable private equity firms. Generally speaking, a private equity firm has historically targeted a return on its equity investment in a range of 30-40 percent over a three- to five-year investment horizon, depending on the perceived risk of the investment. When a private equity firm makes an investment, it will develop a detailed and thoughtful point of view as to how it will achieve this targeted return and will assess all of the risks associated with achieving this return. Given the amount of capital looking for acquisitions, our firm has seen these targeted returns move lower in the past 24 months to a range of 20-30 percent as private equity firms have to work harder to find attractive investment opportunities in a very competitive environment.

So what are the key investment criteria to a private equity firm?

• First and foremost, it is the management of the acquired company. As discussed further below, for “platform” acquisitions most private equity firms look to the management of an acquired company to achieve its growth strategies and targets. Without an effective management team, all of the other factors become irrelevant.

• Second, a private equity firm will develop a financial model reflecting its ability to achieve its target investment returns of 20-30 percent. Factors that affect this outlook will be the projected earnings growth of the business, market position and competition, size of the business, the ability to grow through acquisition, potential cost savings and consolidation benefits, capital required to grow the business, the amount of debt that can be placed on the business (thus decreasing the equity requirement to achieve the acquisition) and other strategies that can achieve above-average earnings and cash flow growth for an acquired company. Further below is a more detailed discussion of these criteria in the context of the RMC industry.

• Third, a private equity firm will carefully assess its ability to exit its investment in a three- to five-year time horizon. To earn its compensation on a fund and to develop a track record for the next fund, a private equity fund is able to raise capital for a new fund only if its historical track record is strong and in the top half or top quartile for comparable private equity firms. Generally speaking, a private equity firm has historically targeted a

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Attractive Characteristics of the Ready Mixed Concrete Industry

Notwithstanding its reputation as a boring, low-growth, mundane, weather-sensitive cyclical construction business, the RMC industry has numerous characteristics that are attractive to private equity firms. As discussed further below, the timing is perfect for private equity firms to step in and play a role in the developing consolidation and forward integration of the cement and concrete industries. These attractive characteristics include:

• Strong and stable industry structure;

• Opportunities for growth through acquisition;

• Numerous benefits associated with consolidation;
Opportunities for valuation multiple expansion; and
Increasingly visible and attractive exit strategies.

Believe it or not, the structure of the RMC industry is attractive to many private equity firms. First, it’s a business that many firms can understand. Most private equity firms make investments in a myriad of industries and rarely do many of them specialize in a specific industry. None of the firms that have recently invested in the RMC industry are specialists in concrete or even construction. Second, it’s an industry that is strategic to our national economy and it isn’t going anywhere. No private equity investor will wake up one morning and find that the business has been outsourced to China or rendered irrelevant by a new technology. Sure there’s cyclical and weather sensitivity but these are risks that can be understood and addressed through capital structure and valuation. There is little if any risk of a total loss of a private equity firm’s investment in an RMC company.

The next attractive attribute is the ability to grow through acquisition. As everyone in the industry knows, there are thousands of small companies in the RMC industry, many of which are projected to be acquired over the next decade. Furthermore, industry developments should accelerate this pace of consolidation and private equity firms are attracted by the opportunity to help finance, develop and benefit from this consolidation. Growth through acquisition is an active growth strategy that is appealing to many private equity firms, as it is a variable they and their management teams can influence.

The third attractive attribute of the industry is the ability to actually realize benefits from the acquisition and consolidation of small private concrete companies. Some of these benefits include lower materials and vehicle purchasing costs, higher priority access to materials (which is becoming increasingly important given the prevalent cement shortages around the country), lower operating costs per yard of production, lower S, G & A costs as a percent of revenues and greater utilization of trucks and people.

Fourth, investment in the RMC industry provides the potential to create equity value through the expansion of valuation multiples. There is no doubt that larger concrete companies sell for higher multiples than smaller concrete companies. This can be for many reasons, including materials purchasing volumes, diversity of customers and revenues, market position, management depth, ability to withstand market downturns and the amount of debt that can be placed on the business. A typical private equity firm strategy might be to (a.) buy a “platform” company for 5-6 X EBITDA, (b.) make “tuck-in” acquisitions of smaller concrete companies at 4-5 X EBITDA, then (c.) sell the larger consolidated concrete company to a strategic buyer or larger private equity firm for 6-7 X EBITDA (or more). This expansion of valuation multiples is critical to a private equity firm’s belief that it can achieve a 20-30 percent return on its equity investment, given the slow fundamental growth of the industry. The combination of improved profitability through consolidation with higher valuation multiples upon exit is a very compelling investment strategy for many private equity firms.

Last but not least, we believe that the increased interest in the RMC industry by private equity firms is due to the consolida-
tion and forward integration taking place in the cement and concrete industry, and the resulting confidence that a private equity firm has in achieving its exit strategy. One could write an entire separate paper on the subject, but there is no doubt of an increasing interest in the United States for cement companies to forward integrate into ready mixed concrete. One only has to see the Lafarge acquisition of The Concrete Company, Holcim's acquisition of Aggregate Industries, Cemex's acquisition of RMC Industries and its recent joint venture with Readymix USA and recently announced ready mixed concrete acquisitions by Rinker, Hanson, Lehigh and Taiheiyo Cement to understand where the industry is headed. Private equity firms can acquire and consolidate smaller concrete companies with confidence knowing that a larger concrete company will be an attractive acquisition candidate for one of the cement producers or international construction materials companies. There is also the possibility of selling a larger concrete company to a larger private equity firm; one of the transactions referred to in this article was sold to a private equity firm despite rumored strong interest from a large industry buyer.

Key Considerations for Sale to a Private Equity Firm

There are numerous considerations for an owner of an RMC company contemplating selling a business to a private equity firm. These considerations fall into three general categories, as follows:

- How the characteristics of the business match up with the investment strategies of private equity firms;
- What forms of sale transactions are available; and
- Life with a private equity firm.

Obviously, the first step is for an owner to assess his or her business and how it matches up with the private equity firm investment criteria set forth earlier in this article. Private equity firm investments can be generally divided into two categories: "platform" investments and "tuck-in (also known as "add-on") investments. Platform investments typically represent an initial foray into an industry and it is with this platform company (and importantly, its management team) that a private equity firm will attempt to execute its investment strategy in a selected industry. Tuck-in acquisitions are subsequent, typically smaller acquisitions that are consolidated into a platform company. As could be expected, the bar is set much higher for a platform acquisition than for subsequent tuck-in acquisitions. An attractive platform company should generally expect a valuation in the 5-6 X EBITDA range while tuck-in acquisitions should gear expectations to the 4-5 X EBITDA range. These ranges can obviously vary depending on many factors but are good general benchmarks from which to set initial expectations for the owner of an RMC company.

The most important criteria to be a platform company is size. As discussed above, larger companies have many characteristics that make for attractive private equity investments. A good benchmark for a minimum size in terms of trailing 12 months EBITDA is $5 million. Depending on markets and profitability margins, this translates into roughly 600,000-800,000 yards of...
where the family desires to no longer be involved with the business and isn’t critical to managing the business. A sale requires a private equity firm to find a management team, either from within the business or from outside, and then to provide them the incentives to achieve the growth objectives for the business.

- A “recapitalization” (also known as a “recap”) transaction involves the reinvestment of a portion of the sale proceeds into continuing ownership in the business by the selling owner/manager of the business. This ownership position is typically 20-30 percent of the equity of the new company. The primary context for a recapitalization is in the establishment of a new platform company in the industry by a private equity firm. There are numerous benefits to a recapitalization for both the acquiring private equity firm and for the selling owner and has become the transaction structure of choice for many private equity firms. The benefits of a recap to a private equity firm are that it keeps an owner/manager involved in running the business and requires that owner/manager to make a significant financial commitment to the ongoing success of the business. The benefits to a selling owner/manager are also very attractive. A recap allows an owner to take a substantial portion of the value of the business off of the table while remaining primarily responsible for running the business. It also develops a partnership with a source of capital and business expertise that can assist the owner in growing the business and executing an acquisition and consolidation strategy. Lastly, it provides a “second bite at the apple” to the owner when the business is sold again in three to five years. The economics of a recap can be very compelling to a selling owner who desires to take advantage of current market conditions to monetize a portion of the value inherent in the business while also continuing to run and grow the business for the next five years.

Lastly, an owner of an RMC company who remains involved in the business post-sale to a private equity firm needs to prepare for life with a private equity firm. Most private equity firms delegate all the day-to-day management decisions and operations of a
platform company to the managers of the business and participate in strategic decisions through board participation. Many selling owners frankly welcome this strategic input and benefit from the experiences of the private equity firm board members. That being said, a selling owner who stays involved should be prepared for additional internal (and potentially external) reporting requirements and will now have to discuss many of his or her business decisions with others who have a stake in the outcome. Not all independent, entrepreneurially driven business owners make this transition easily. While part of the acquisition evaluation for a private equity firm is to assess the capabilities of a management team, a selling owner should also focus on his or her compatibility with the private equity firms interested in buying the business, particularly in the context of a recap. Lastly, while a recap keeps an owner involved in running the business, it is the first step in the ultimate sale of the business. An owner who sells a business through a recap needs to be prepared for an outright sale, probably to an industry buyer, in the next three to five years.

Case Studies of Recent Industry Transactions

In the beginning of this article, I mentioned three recent transactions that highlight the increasing private equity interest in the ready mixed concrete industry. Each of these transactions has its own rationale and can be instructive as to how outside investors are investing in the industry. Set forth below is a brief discussion of each of these recent transactions.

- **Southern Star Concrete.** In the summer of 2003, Texas Growth Fund and Austin Ventures acquired the Dallas-based Texas and Arkansas concrete operations that were acquired by Hanson in its acquisition of Pioneer. Interestingly, these private equity firms had not targeted the RMC industry for investment but rather were able to move quickly to take advantage of an opportunity to acquire this business in partnership with the management team of the business. The buyers’ primary investment thesis was to buy the business inexpensively when conditions were less attractive, take actions to immediately improve the financial position of the business and then wait for market conditions to improve. Thus far the strategy appears to be working, as Southern Star was able to immediately and strongly increase its financial position by selling non-core operations and improving the working capital management of the business. One phenomenon that the buyers may not have anticipated is the increasing focus on the forward integration of the cement business in the United States. At the time this business was sold in 2003, there was reportedly very little if any interest in it from cement producers or importers in Texas, and the buyers were reportedly able to acquire Southern Star at an attractive valuation. While we know of no plans for the current owners to sell the business, when or if they do we would expect several cement producers or international construction companies to have an interest in the business, which should drive valuation higher. Southern Star produces about 5 million yards of concrete per year, which creates a meaningful amount of cement demand for many prospective buyers.

- **Angelle Concrete.** Angelle Concrete executed a recapitalization in late 2004 with Shoreview Industries, a Minneapolis-based private equity firm. Angelle is based in Jennings, LA and the owners of Angelle also own South Louisiana Cement, an independent cement importer. While the financial details are not available, the recapitalization allowed older family members to extricate their value from the business while keeping the current management team in place. The recap also enabled the consolidation of four legal entities (including South Louisiana Cement) into one company. Shoreview stepped into the majority owner’s position in the business and is providing the capital for Angelle to pursue its strategy of acquiring rural concrete companies in markets contiguous to its current operations.

- **Ready Mixed Concrete Company.** Ready Mixed Concrete Company (“RMCC”) was sold to Audax, a Boston-based private equity firm, also in late 2004. RMCC is a very profitable business with strong market positions in many of the major metropolitan areas in North Carolina, South Carolina and southern Virginia. RMCC currently produces about 2.3 million yards of concrete and has the business strategy of continuing to
make tuck-in acquisitions of smaller concrete companies in contiguous markets. Audax was attracted to RMCC by its profitability, market position, management team, equipment base and safety record, ability and potential to continue to make acquisitions and its ability to realize the benefits of consolidation. RMCC was reportedly sold for more than 7 X EBITDA, providing an excellent example of the benefits of size, management and growth potential as well as the ability to place a significant amount of debt on larger companies.

Overall, we believe that many factors will continue to bring private equity investment into the ready mixed concrete industry and that private equity firms will play a key role in the consolidation of the United States concrete industry. As discussed above, the industry in the U.S is clearly moving toward a structure of forward integration with the major cement producers and, given the dynamics of the cement industry, access to cement supply will become increasingly important and problematic for smaller RMC companies. Private equity firms will step into the role of acquiring and consolidating smaller concrete companies and building larger companies that, (a.) can develop better and less expensive access to cement supplies, (b.) operate more efficiently, and (c.) will ultimately become attractive acquisition candidates for cement producers seeking additional forward integration. We believe every owner of an independent RMC company in the United States should be monitoring these events closely and be proactive about developing a strategy for his or her business as this industry restructuring unfolds.

Blackburn is a managing director at Growth Capital Partners, L.P. For more information, he can be reached at 281/272-4410 or via email at ablackburn@growth-capital.com. Blackburn will also be a featured speaker at NRMCA’s 47th annual Business Administration Conference in Napa, CA, October 16-19, 2005. For more information about this conference, please contact Michael Forster at 240/485-1130 or via email at mforster@nrmca.org.

The views and opinions expressed in this article are those of the author and do not necessarily reflect the views and opinions of the National Ready Mixed Concrete Association.
The construction industry in the United States is like the Titanic sometimes. You send the message to turn hard to port but it takes a long time for the ship to start turning and an even longer time to actually complete the turn. Before you know it, you hit an iceberg at that pace. Changing construction methods, techniques and traditions is a long-term effort in the construction industry. Fortunately, sustainable building ideology is spreading like a wildfire across America and it may just be the catalyst needed to drive change around outmoded and less efficient ways of constructing our built environment. This article is going to focus on one aspect of that change, wall systems.

The traditional construction method of choice for residential and some light commercial projects is wood frame construction. This must have originated from our pioneer and agrarian roots. Land and trees were plentiful and a man with a horse, mule or ox and some hand tools could hack out a dwelling in the wilderness. As the wilderness became more densely populated, entrepreneurial Americans created sawmills and introduced more refined construction techniques using lumber. Unfortunately, little has changed in over a hundred years of building in this manner. In the southern United States where I live, the moniker “stick built” is a commonplace name for this type of construction.

A number of types of concrete wall systems are increasingly being used in commercial as well as residential construction. Concrete wall systems generally fall into one of three types:

- Concrete placed in conventional forming systems
- Insulating concrete form systems
- Tilt-up construction

All three construction processes surpass the performance of competing methods in numerous ways. Those ways include sustainability, speed of construction, security, comfort and last but surely not least, cost.

Webster’s online dictionary defines sustainable as, “of or relating to a lifestyle involving the use of sustainable methods.” Concrete has proven itself to be one of the best materials to use when sustainability is one of the project goals. What material lasts longer than concrete? Wood can rot, it exhibits substantial creep under sustained loading and is consumed by a number of insects. Even when pressure treated, most wood products are not warranted past 30 years. Steel is susceptible to corrosion when exposed to the environment. In order to last extended time periods, steel must be coated, painted or modified in some other way. Concrete on the other hand can last for genera-
The most noted advantage of concrete wall systems is the effect on reducing energy consumption for heating and cooling loads. Concrete walls have a large thermal mass effect that reduces energy consumption. By taking a long time to heat up or cool down, the large mass of the concrete wall creates a leveling effect for the HVAC system so it has less peaks and valleys in the load it must offset. This is no small effect. By spreading the heating or cooling loads out over a greater portion of the day, in many cases a smaller HVAC system can be employed. This is not only good for the environment, it is good for everyone’s wallet. Also, concrete walls don’t have as many places for air to infiltrate and waste precious heating and cooling energy. In many parts of the United States, stick build buildings are now required to be sealed with foam sealants to try and address this wood frame construction limitation.

Just like other construction methods, you can insulate concrete walls to meet any climatic need. Insulated concrete forms include the insulation as a stay-in-place form. Tilt-up construction can be insulated in the casting bed or once tilted into place. Many traditional cast-in-place wall form manufacturers offer forming systems that allow insulation to be placed prior to the concrete creating a sandwich panel. All of these can add significant R-values where needed. Concrete savings can be measured.

Speed of construction is an area where some may debate concrete’s advantages. Naturally, when any technology is new like ICF or Tilt-up in a market, there is a learning curve that contractors and subcontractors must push through. Once the market has some experience with concrete wall systems, the speed of construction is generally not debated. All three systems noted here have shown dramatic productivity gains over conventional techniques in many markets.

Security is a less tangible benefit of concrete wall systems, until the time it matters to you or your family. Wind events like hurricanes and tornadoes can be devastating and...
threaten not only property damage but in many cases loss of life. Concrete walls have proven to be superior over many competing systems time and time again. Just look at the pictures of Hiroshima after the dropping of the atomic bomb in WWII. Some of the only buildings remaining were reinforced concrete structures. Another aspect of security includes errant cars and trucks. ICF homes have been hit by cars and trucks and exhibited as little as a few hundred dollars in cosmetic damage. Wood frame homes have been shown in the media with cars literally in the living room or bedroom after an accident. While working construction during a summer break from college, I personally jacked up the side of a brick-faced wood frame home that a truck had run through. The inherent fire resistance of concrete wall systems outperforms other building materials in most applications. In many applications, national codes recognize concrete structural systems as not requiring additional fire protection. Steel generally requires a spray-on fire protection material and wood generally has to have layers of fire protection surrounding it. Concrete wins hands down on security issues like wind, vehicular intrusion and fire resistance.

Comfort can include many things. Consistent temperature has been noted earlier (due to the thermal mass effect). What about the sound level inside your home? Concrete wall systems consistently outperform wood or steel frame buildings in this measurable performance criterion. While not something we think about, if it means a better night’s rest to you, how will that effect your tomorrow?

The first cost difference between concrete walls and other products has virtually disappeared in many markets in the U.S. Over the last decades, the price of wood and steel continue to grow at a faster pace than that of concrete. If you don’t believe me, follow the materials cost indexes at www.construction.com, home of Engineering News-Record, a leading McGraw-Hill publication. While steel has seen some price reductions this year, you need to look at last year’s major price run up to get the whole picture. Monthly numbers don’t show the trends. Even if you don’t believe that concrete walls are competitive on a first-cost basis, when you look at the life cycle cost and add in maintenance, repair and replacement costs, heating and cooling costs to name a few, concrete almost always wins the life cycle battle.

Despite our industry’s notorious reputation for not embracing change, with these many advantages it is inevitable that concrete wall systems will continue to gain traction in the marketplace. Owners, architects and engineers are generally the first to embrace the change, but there are many contractors across America who have developed profitable business models with these proven construction techniques. When you consider sustainability, speed of construction, security, comfort and cost, concrete wall systems are the system to choose. The next question is which of the three types of concrete wall systems make the most sense for your project?

For more information on insulating concrete form construction, visit www.forms.org. For more information on tilt-up concrete construction, visit www.tilt-up.org. For information on the most versatile building material in the world, visit www.nrmca.org.
OSHA enforcement at ready mixed concrete operations is somewhat different with regard to which standard(s) are most commonly cited relative to other materials’ sectors. For example, violations of the confined space standard (29 CFR 1910.146) are the number one violation at ready mixed concrete operations. To prepare a facility for an OSHA ‘wall to wall’ inspection, one should review the list of the 10 most commonly cited OSHA standards for our industry.

#10. Abrasive Wheel Machinery (29 CFR 1910.215)

When this condition is cited at ready mixed concrete operations, generally the operator has not maintained at least one-quarter-inch clearance between the adjustment tongue and the abrasive wheel on the shop grinder. Another condition that may lead to a violation of this standard is an inadequate guard on the grinding wheel itself.

#9. Mechanical Power Transmission Apparatus (1910.219)

This mandatory standard deals with guarding. For example, all moving parts must be guarded to prevent employee contact unless the parts are guarded by location, and this generally means that the parts are located at least seven feet above a walking/working surface. The guards around belt pulleys must be closed so an employee cannot come into contact with the moving machinery.

#8. Portable Fire Extinguishers (1910.157)

Fire extinguishers must be properly mounted and easily accessible. Furthermore, extinguishers must be fully charged and ready for use, visually inspected monthly for charging and annually inspected for maintenance. The annual inspection must be recorded and the record must be maintained.
#6. Wiring Methods and Components (1910.305)
When conduit enters a junction box, the conduit must enter with proper bushing, meaning the bushing must be stable and durable. All boxes must have undamaged cover plates. Flexible cords and cables may not be substituted for permanent wiring. For example, cords may not be run through walls, doors, etc. in order to supply power to an object.

#5. Guarding Floor and Wall Openings (1910.23)
In general, when a walkway, platform or storage area is located four or more feet above ground level, then standard hand rails and toe boards must be provided. If a producer stores supplies on an upper level in the shop, for example, then the level must have standard hand rails, mid-rails and toe boards.

#4. Hazard Communication (1910.1200)
The standard essentially requires that producers write a hazard communication program, inventory all hazardous substances used or stored at the site, and then train employees so they know how to deal with the hazards that the substances may possess.

#3., #2. and #1. Respiratory Protection, Control of Hazardous Energy and Confined Space, respectively (1910.134, .147 and .146)
These three standards were combined because they are intertwined at ready mixed concrete operations. In other words, a violation of one standard can easily trigger violations of the other two, especially when the initial violation is of the confined space standard. When a producer does work that requires confined space planning and permitting, then the producer must make sure that all hazardous energy has been isolated, locked out and tagged out.

All the conditions that can lead to violations of these 10 standards cannot be detailed here. By knowing which conditions likely result in citations, ready mixed concrete producers can audit their respective operations for compliance, and thereby significantly reduce the likelihood that citations will be issued. All the standards that regulate general industry operations are posted on the OSHA web site. This web address directs the user to ‘General Industry’ requirements: (http://www.osha.gov/pls/oshaweb/owa-stand.display_standard_group?p_toc_level=1 &p_part_number=1910).

Education in the rules and regulations that govern our industry is of paramount importance if one wishes to operate in compliance.

For more information, contact Harman, NRMCA’s director of safety compliance, at tharman@nrmca.org or 240/485-1155.

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Precision of Strength Tests

By Colin Lobo, Ph.D.
Vice President of Engineering, NRMCA

While complaints abound with strength tests on concrete jobs, believe it or not the mundane cylinder strength test is one of the more precise tests we have for acceptance of concrete. Notice the term used was precise and not accurate.

There are a wide variety of factors that can influence the accuracy of a strength test result and most any deviation from the standard procedures for making, handling, curing, capping and testing cylinders will result in a lower measured strength. A classic paper that quantifies the effects of these testing factors is one by Richardson — Review of Variables That Influence Measured Concrete Compressive Strength — available from NRMCA as Publication 179. NRMCA Concrete in Practice (CIP) Sheets 34 and 35 also discuss proper procedures for making and testing cylinders, respectively.

Precision is a measure of the robustness of a test method. It indicates how well testing labs can achieve similar results within the variations allowed in the procedures. All standard test methods published by ASTM have (or should have) a precision statement. The precision statement gives the user an idea of how repeatable test results should be when the same material is tested more than once in the same lab

Precision is a measure of the robustness of a test method. It indicates how well testing labs can achieve similar results within the variations allowed in the procedures. All standard test methods published by ASTM have (or should have) a precision statement. The precision statement gives the user an idea of how repeatable test results should be when the same material is tested more than once in the same lab

<table>
<thead>
<tr>
<th>Average Strength, psi</th>
<th>Multi-Lab</th>
<th>Within Test</th>
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<tr>
<td>7728</td>
<td>209.1</td>
<td>209.1</td>
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<tr>
<td>8482</td>
<td>411.4</td>
<td>411.4</td>
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Within test standard deviation, psi (CV) 209.1 (2.7%)
Multi lab standard deviation, psi (CV) 411.4 (5.3%)

Data are being collected for 4 x 8-inch cylinders made in the field. For field tests, the acceptable difference of two cylinders is 8% of the average strength for 6 x 12 cylinders. This means that when one looks at a series of test results and sees that the difference between companion cylinders exceeds 8% of each average very often (more than 1 in 20), there is most likely a problem with the testing procedures. ACI 214 has a table that provides a means of rating a laboratory’s performance based on the within-test coefficient of variation. ASTM C 39 also has a multi-lab coefficient of variation for 6 x 12-inch cylinders at 5%. This would apply to sets of companion cylinders prepared
from the same sample tested in two different labs, in which case the test results (average of 2 cylinders) from two labs should not differ by more than 14% of the average.

Round Robin Testing Programs

In the Washington, D.C., metropolitan area, the Washington Area Council of Engineering Laboratories (WACEL), a local association representing commercial testing laboratories, organizes an annual strength testing round-robin program in concert with local ready mixed concrete producers. Approximately 60 labs, including commercial labs, ready mixed producers and state highway agencies participate annually. Participation in the program is voluntary with no fees to the testing facilities. Confidentiality of the participants is maintained by giving each participating laboratory an identification number by WACEL, and the identity of individual participants is not revealed. WACEL members’ participation fulfills requirements for reference sample testing in WACEL’s laboratory accreditation program.

Test cylinders are prepared at the laboratory of a local ready mixed concrete producer with concrete delivered in a truck mixer. Generally, two strength level concrete specimens are prepared. The cylinders are cured in the laboratory for the first day following which the participants pick up the cylinders, cure them at their facilities and test them at 28 days. The data is reported and analyzed according to ASTM C 802 — Standard Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods for Construction Materials.

Figure 1 illustrates the range of strength test results from the participating laboratories (1a) and also illustrates the range of two cylinders tested in the same lab (1b). Figure 2 illustrates the within-test and between lab variability of strength tests in terms of the standard deviation. It demonstrates that the variability, when expressed as the standard deviation, increases when testing concrete with higher strengths (Ref 1). Figure 3 illustrates these precision estimates in terms of coefficient of variation (standard deviation divided by average). This is relatively constant over the strength range of concretes tested and is the preferred way of expressing precision of strength testing (Ref 1). The within test coefficient of variation is on average at 2.5% and the multi-lab coefficient of variation is on average at 4.8% over the strength levels tested (Ref 1).

Round robin testing or reference sample testing programs provide

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the opportunity for laboratories to compare their results to those of other laboratories and the overall average and make appropriate decisions on modifying procedures and practices if necessary.

How About 4 x 8-inch Specimens?

Traditionally the standard size of cylinders used for acceptance testing is 6 x 12 inch. It is becoming more common to use 4 x 8-inch specimens as the standard size and many parts of the country use only this size. Some state highway agencies have adopted the smaller size specimens for acceptance purposes also. The 4 x 8-inch specimens need a smaller concrete sample and are easier to handle and cure on the jobsite. Typical test machine load capacity less than about 500,000 lbf. can be used to test higher strength concrete. Concrete producers and commercial labs apparently prefer 4 x 8-inch specimens, but the specification should permit this size to be used. One problem has been that ASTM C 39, until recently, did not address precision of strength tests on 4 x 8-inch specimens. It is generally thought that 4 x 8-inch specimens result in a marginally higher strength, but strength test results are also slightly more variable.

A recent round robin conducted in Minnesota was conducted to develop precision information on 4 x 8-inch specimens (Ref 2). Five strength levels — nominal 3000 to 8000 psi concrete batches were included with 20 labs participating. Figure 4 is a summary of the results from this study. Figure 4 includes precision estimates in terms of standard deviation (plotted to the left axis) and in terms of coefficient of variation (plotted to the right axis). These data indicate that the within test precision of 4 x 8-inch cylinders is on average at about 2.9%, which is similar to that of 6 x 12-inch cylinders. The multi-lab precision is on average about 4.7%. This is also similar to that of 6 x 12-inch cylinders but it was noticed to be marginally higher for the two higher strength concretes as illustrated in Figure 4.

References

Report of DC Metropolitan Area Round Robin Strength Testing Program — 2005, Colin Lobo, available on request — clobo@nrmca.org

Precision Tests of ASTM C 39 using 4 x 8 in. Cylinders, Rachel J. Detwiler, Terry E. Swor, and Wendy Thomas, submitted for publication, (Detwiler, senior materials engineer with Braun Intertec Corp. in Minneapolis, provided a preliminary copy of the submitted paper).

Dr. Lobo is vice president of engineering at NRMCA. For more information, contact him at clobo@nrmca.org or 240/485-1160.

Figure 4: Precision Estimates of 4 x 8-inch specimens from the Minnesota Study (Ref 2)
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What is Old is New Again

Total Quality Management Drives a QC Lab

By Eileen Dickson
Director of Education & Training, NRMCA

As ABC Ready Mix Quality Control Supervisor, Mike called a department meeting the morning after XYZ Testing Labs notified him that the mix his staff designed for a custom floor job did not achieve the compressive strength of a competitor’s mix design. “The future is clear — we must constantly improve so we can meet the challenge of new specifications like this because our competition can, and will,” he told his staff. “You want job security? Be better today than you were yesterday!”

A tough approach, but this was not the first time Mike had a message like this. He just didn’t understand how his QC department’s results could be so inconsistent. He could see that the level of the work load did not impact his department’s results. Some weeks were smooth sailing while other weeks were like living in Tornado Alley. At times, his department spent almost as much time recalculating a mix design as they did getting it right the first time.

Although Mike already had replaced four out of the 11 QC technicians, he still was not satisfied with his team’s results. Remaining on the current course would not satisfy top management — not with two other RM producers breathing down ABC’s neck and product liability litigation on the rise. Mike needed an improvement plan that his team not only could manage but would drive them further.

Mike decided to introduce his staff to an improvement process that he learned as a new employee 25 years ago. The process was based on W. Edward Deming’s Plan-Do-Check-Act (PDCA) model, a process of quality assurance that keeps everyone focused on working smarter, not harder.

Through his efforts to lead his department and institute PDCA, Mike also learned that problem solving is critical to continuous improvement. He made sure every technician understood the problem-solving process. To facilitate the process, he organized his department into several problem-solving teams to address issues that were causing negative results. The department’s reaction was almost immediate; they began addressing significant problems one by one and brought successful resolution to many.

There are many different approaches to implement a process that continually improves and produces quality results. As the team leader, Mike never could allow himself or his employees to be satisfied with “good enough,” thereby shifting into cruise control. When that happened, Mike would see problems creep back in to performance.

Building continuous improvement starts by becoming familiar with Deming’s teachings about Total Quality Management (TQM). Deming was an engineer by training who specialized in manufacturing methodology improvement. Many in our industry see his system as a tight fit that can address our challenges. Deming’s TQM is a business philosophy with principles based on customer satisfaction and implementing a carefully designed process to produce consistent products or services. Deming’s four principles of TQM are customer satisfaction, continuous improvement, respect for people, and managing with information and analysis. The last principle recognizes that quality is determined by the system, including the inputs and the manner in which the first two aspects are processed.

W. Edward Deming’s 14 Points of Management

The Essence of Total Quality Management

1. Innovate and allocate resources for long-term planning, education and research to fulfill the long-term needs of the company and customer rather than short-term profitability.
2. Stop accepting nonconforming products and services.
3. Prevent initial defects in the manufacturing process by designing and building quality processes with ongoing statistical measurement, rather than fix defects after they occur.
4. Stop giving business to the lowest-priced source supplier because price has no meaning without an integral consideration for quality. Encourage suppliers to use statistical process control.
5. Identify systemic and indigenous waste to statistically increase production quality and increase productivity.
6. Institute thorough job-related training at all levels. Training is not an option.
7. Provide supervision with knowledge of statistical methods; encourage use of these methods to identify which nonconformities should be investigated for solutions.
8. Reduce fear throughout the organization by encouraging open, two-way, non-punitive communication. The economic loss resulting from fear to ask questions or reporting trouble is appalling.
9. Help reduce waste by encouraging design, research and sales people to learn more about the problems of production.
10. Eliminate the use of goals and slogans to encourage productivity unless training and management support also is provided.
11. Closely examine the impact of work standards. Do they consider quality or help anyone do a better job? They often act as an impediment to productivity improvement.
12. Institute rudimentary statistical training on a broad scale.
13. Institute a vigorous program for retraining people in new skills to keep up with changes in materials, methods, product designs and machinery.
14. Create a structure in top management that will push every day for continuous quality improvement.
Briefly, here’s how PDCA works.

The first step is to PLAN; an individual or team engages in a planning process that involves recognizing potential obstacles or problems. The team explores possible root causes and determines what steps should be taken to correct the negative situation.

Once a plan is conceived, the next step is to put the plan into action, to DO. This effort is stronger when the plan is formalized and clearly communicated to all involved parties. As the plan is implemented, it is important to monitor its progress, looking for adjustments that need to be made in order to achieve the expected results.

The third step in the monitoring process is to CHECK, that is, to assess the process at critical points to ensure that the action plan is working successfully. Critical performance indicators are often created at this point to assist in monitoring the needed performance.

If improvement of performance is necessary, appropriate action is taken; thus, the final step is to ACT, completing the improvement process.

However, the PDCA is continuous. Acting is followed immediately by renewed planning, and the four steps are repeated over and over to maintain performance. The term continuous improvement implies that something can always be improved, or in other words, your company can always strive to do things better tomorrow than you did them today.

The reasons RM producers and their internal work teams should be dedicated to continuous improvement are simple. First, competitors are working feverishly to win over customers by offering quality and convenience that another ready mixed concrete producer fails to offer. Second, products and services that meet today’s quality standards may not meet tomorrow’s standards. The ready mixed concrete production process is a constantly changing environment in which people, technology and expectations invariably change over time. Finally, people and ready mixed producers, as with any company in any industry, tend to take the path of least resistance, get apathetic and sloppy when they stop striving for improvement. Ours is not an industry that can survive profitably with a “git ‘r dun” modus operandi.

Deming preached that the most important skill area for maintaining a culture of continuous improvement is problem solving. Good problem solving skills that focus on developing the best long-term solutions are invaluable in the continuous improvement process. These include using methods like quarterly department performance audits, goal setting, team walk-throughs and continuing education. Continual processes like these will set your team apart and help your company excel.


Workforce Management, Todd Raphael [dearworkforce@email.workforceonline.com]; Janice Burns, Development Dimensions International, Pittsburgh, June 6, 2005.

For more information about NRMCA’s educational programs, please contact Director of Education Eileen Dickson at edickson@nrmca.org or 240/485-1164.

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Off Road Equipment …

World Wide Tire Shortage

By Gary Mullings
Senior Director of Operations & Compliance, NRMCA

Large, off-the-road tires, like those used on loader equipment at a ready mixed concrete facility, are a hot commodity these days. Demand is simply outstripping supply as military, construction and mining activities pressure the market. Shipments of large, off-the-road tires rose 33 percent in 2004 from 2002, according to Modern Tire Dealer publication. Says a Seattle-based regional manager at Tire Distribution Systems, "I've never seen it this bad, not even close."

Automobile tire supplies are not affected, but a manufacturing facility cannot simply be retooled from making tires for cars into one that makes massive tires. The construction vehicles themselves are widely available, and so far, companies have been able to scrape together enough tires to keep going. Tire companies say the shortages are expected to persist through 2006 and possibly beyond 2007.

"It’s an emerging crisis for our industry,” says Scott Hammersley, vice president of New Rock Materials in Newington, VA.

Barefooted trucks... USA Today reports of a mining operation in Utah that is "expecting five new large-haul trucks to arrive shortly. The trucks will be coming without tires.”

Ready Mix and Construction... The ready mixed concrete industry and overall construction picked up in 2004 and has continued to grow in 2005, creating demand for more off-the-road tires.

Asia... Asian countries, especially China and India, have been exploding economically, leading to more construction and mining. These developments have led to greater tire demand.

Military... Military operations in Iraq and Afghanistan have led to demand for large tires to fit machinery.

Tire factories working overtime... Tire manufacturers are working overtime to try and meet the demand. For example, Goodyear’s Topeka plant is working 24 hours a day, seven days a week.

Silver Lining... The demand for large off-the-road tires is high, and therefore, important tire-care lessons learned from the off-the-road tire experience could increase the service life of all tires. Now is the time for all ready mixed concrete producers to look at their tire care programs. The terrain that ready mixed trucks operate in is often littered with debris, which must be monitored and removed. These objects can puncture and ruin new tires very quickly. According to tire industry data, just 7 percent of off-the-road tires are actually “worn out” when they’re removed from service; tread and sidewall cuts and impacts account for 74 percent of the removals. Ready mixed concrete facilities need a focused tire program — with weekly tire inflation checks, proper tire repair and site surveys that will allow tires to last much longer than normal.

For more information, contact Mullings, NRMCA’s senior director of operations and compliance, at gmullings@nrmca.org or 240/485-1161.
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2. 2PBSC — Performance-Based Specifications for Concrete (Pkg. of 50) — This 4-page reprint of an article featured in the May 2005 issue of STRUCTURE magazine is an ideal introduction to performance-based specifications for concrete. It provides details on the NRMCA P2P Initiative (Prescriptive to Performance) and describes how moving toward performance-based specifications is the next logical step in the evolution of the concrete construction industry. The article concludes that performance-based specifications can result in innovative products and construction processes, higher quality, reduced cost and satisfied customers. This reprint is ideal as a handout during presentations or as an insert for direct mail campaigns. Coauthored by Colin Lobo, Ph.D., P.E., Lionel Lemay, P.E., S.E., and Karthik Obla, Ph.D., P.E. ($50 members, $50 non-members)

3. 2PP188 — Truck Mixer Driver’s Manual — Revised 2004 — This manual educates truck mixer drivers about concrete and customer relations. Completely updated for 2004, it also highlights driver duties, safety precautions, equipment inspection and maintenance procedures, and what the driver should do in case of an accident. This 64-page manual is easy to understand and contains common sense information every driver should know. ($10 members, $40 non-members); (20 or more copies $8 members, $32 non-members)

4. 2PFB119 — Concrete Floors and Moisture — Understanding moisture in concrete leads to design of floors and flooring systems that provide excellent service for many years. This book discusses sources of moisture, drying of concrete, methods of measuring moisture, construction practices, specifications and responsibilities for successful floor projects. Reference: Kanare, Howard M., Concrete Floors and Moisture, EB119, Portland Cement Association, Skokie, Illinois, and National Ready Mixed Concrete Association, Silver Spring, Maryland, USA, 2005, 164 pages. ($30 members, $40 non-members)

5. 2187 — Compilation of ASTM Standards Relating to Concrete — Contains 43 ASTM specifications, practices and test methods relating to cement, fly ash, slag, silica fume, admixtures, aggregates and concrete. Included in the ASTM Manual of Aggregates and Concrete Testing. Reprinted by NRMCA in January 2005, it contains the most recent versions of the ASTM standards at that date. ($40 members, $60 non-members)

6. 2P159 — Concrete Plant Operator’s Manual — Jointly prepared by the Concrete Plant Manufacturers Bureau and NRMCA, this manual is a comprehensive guide for the batch plant operator. It includes valuable information on materials, batch tolerance and aggregate moisture, calculations, plant maintenance, safety and more. ($20 members, $80 non-members)

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ConcreteParking.org is a new, exciting and comprehensive promotional tool for the world’s best paving material. Link to this new site today from your Web site to put this current and persuasive information to work in positioning concrete parking with your clients and prospects. The site covers concrete parking’s economic benefits, environmental benefits, curb appeal and new technologies for fast placement.

The site also contains up-to-date information on concrete parking applications, including conventional concrete parking, pervious concrete parking, parking structures, white topping and concrete paths.

You and your customers will also find other helpful links and resources including information on promotional brochures such as Pervious Concrete...When it rains, it Drains, and Concrete Parking...It’s like money in the bank.

Help the world beat a path to the door of ConcreteParking.org, it’s the first and best link for concrete parking promotion.
Unlock Your Company’s Potential through the NATIONAL READY MIXED CONCRETE ASSOCIATION

Here is how to apply!

1. Please type or print

   Company ______________________________________________________________________________
   Name/Title ____________________________________________________________________________
   Street Address ________________________________________________________________________
   City, State & Zip ______________________________________________________________________
   Phone _______________________ Fax ______________________________________
   E-mail ______________________________________________________________________________


   Minimum Dues Level (for all members producing less than 20,001 cubic yards): $350

   _______________ x 0.0175 = _______________
   2004 cubic yard production (if over 20,000 cyd.) x 1.75 cents = Your 2005 Membership Dues

   per cubic yard

3. Choose Your Payment Option (choose one):

   ☐ Annual Payment - Full year payment enclosed
   ☐ Quarterly Payment - First quarter payment enclosed
   (Dues total must be greater than $1,000)

4. Payment Type:

   ☐ By Check (please make checks payable to: NRMCA)
   Charge to: ☐ Amex ☐ VISA ☐ MasterCard
   Card No. __________________ Exp. Date __________
   Name on Card ____________________________________
   Signature ______________________________________

Questions? Call 1-888-846-7622
Kathleen Carr-Smith, ext. 1145 or Kimberly Pittmon, ext. 1146
Fax Completed Application to: (301) 585-4219
or Mail to: NRMCA 900 Spring Street Silver Spring, MD 20910

Benefits for your Dues Dollars

Exclusive member updates and alerts on federal legislation and regulatory issues affecting the ready mixed concrete industry, including pressing environmental concerns
Valuable discounts on NRMCA publications and member payment options
Participation in NRMCA’s landmark Industry Data Survey and Compensation Survey
NRMCA’s Membership Directory, a valuable listing of industry leaders
Special pricing options for NRMCA forums, conferences and meetings
Access to NRMCA’s nationally acclaimed Sales Certification Program and Concrete Delivery Professional Program
NRMCA’s member communications including a subscription to Concrete InFocus magazine and our weekly e-mail news update.
Expert technical assistance from the NRMCA professional Engineering staff
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- **Stephens Manufacturing Co., Inc.**

### Environmental
- **Envirosurf Corp.**
- **Prime-A-Pac**

### Fiber Reinforcement
- **Chryso**

### Financial Services
- **Growth Capital Partners**

### Fly Ash
- **Headwaters Resources**
- **Separation Technologies, LLC**

### Lift Axles
- **Hendrickson International**
- **Link Manufacturing**
- **Watson & Chalin Manufacturing, Inc.**

### Management Consulting
- **FMI Corporation**

### Mergers & Acquisitions/Investment Banking
- **Allen Villere Partners**

### Mixer Liners
- **Argonics, Inc.**

### Mixer Truck Cleanout
- **Coast 2 Coast**

### Mixer Trucks
- **Truck Mixer Manufacturers Bureau**

### Mixers
- **Teres Advance Mixer, Inc.**

### Pneumatic Conveying
- **Steam Engineering**

### Ready Mix Plants
- **Merts, Inc.**

### Safety Equipment/Fall Protection
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### Saw Blades
- **Soft-Cut International**

### Truck Mixers
- **Schwing America, Inc.**

### Trucks
- **Mack Trucks, Inc.**
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- **Pearson Heating Systems, Inc.**

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So, what’s your preference? Front-discharge, rear-discharge—or both? Any way you look at it, Terex Advance is looking mighty good for your bottom line.
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- The industry’s only Roll & Fold boom with a 3rd section that can articulate up to 240 degrees
- Conform ultra 2 boom pipe
- Omnex radio remote control
- Most stable pump in the industry - front spread 20’8” - rear spread 26’2”
- 224 cubic yards per hour (171 cubic meters) pumping kit
- Stiebel PTO & Rexroth hydraulic pumps
- 400 hp Mack MR 688S
- Eaton Fuller 10 speed transmission (RTO-14908LL)
- Aluminum wheels
- 3 year limited warranty on all 2005 models

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